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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SAMUEL D. PRITCHETT, JEFFREY A. SCHLANG,
SHERIF EMBABI, ALAN HOLDEN, and
FRANCESCO DANTONI

Appeal 2007-3530
Application 09/851,191
Technology Center 2600

Decided: July 14, 2008

Before KENNETH W. HAIRSTON, MAHSHID D. SAADAT, and MARC
S. HOFF, *Administrative Patent Judges*.

HAIRSTON, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from a final rejection of claims 1 to 19. We have jurisdiction under 35 U.S.C. § 6(b).

We will sustain the rejections.

STATEMENT OF THE CASE

Appellants have invented a digital-IF¹-to-baseband converter that is integrated into a RF receiver physically separated from a cooperating baseband processor apparatus (Figures 3 and 4; Specification 6, 7, and 17).

Claim 1 is representative of the claims on appeal, and it reads as follows:

1. An RF receiver apparatus, comprising:
 mixing circuitry formed on a first integrated circuit for mixing an analog RF signal down to an analog IF signal;
 an analog IF-to-digital baseband converter formed on said first integrated circuit and coupled to said mixer for converting said analog IF signal into a digital baseband signal; and
 an output coupled to said analog IF-to-digital baseband converter for transmitting said digital baseband signal.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Fukuda	US 4,665,532	May 12, 1987
Patel	US 6,480,528 B1	Nov. 12, 2002 (filed Jun. 11, 1999)

Gerhard Troster, *An Interpolative Bandpass Converter on a 1.2- μ m BiCMOS Analog/Digital Array*, IEEE Journal of Solid-State Circuits, Vol. 28, No. 4, Apr. 1993, pp. 471-477.

¹ Abbreviation for intermediate frequency.

The Examiner rejected claims 1 to 5, 7, 9, and 12 to 18 under 35 U.S.C. § 103(a) based upon the teachings of Appellants' admitted prior art and Troster.

The Examiner rejected claim 6 under 35 U.S.C. § 103(a) based upon the teachings of Appellants' admitted prior art, Troster, and Patel.

The Examiner rejected claims 8, 10, 11, and 19 under 35 U.S.C. § 103(a) based upon the teachings of Appellants' admitted prior art, Troster, and Fukuda.

ISSUE

Appellants contend *inter alia* that the applied references are not properly combinable, and, if combined, do not teach or suggest all of the limitations of the claimed invention (Br. 5). The issue before us, therefore, is whether the applied prior art teaches or would have suggested to the skilled artisan the claimed RF receiver apparatus and method?

FINDINGS OF FACT

1. Appellants' admitted prior art includes a mixer (not shown) that receives an analog RF signal, and produces analog input IF signal 17 that inputs A/D converter 12 in RF receiver 11 (Figure 1; Specification 1 and 3). The A/D converter 12 converts the analog IF signal to digital IF signal 19 (Specification 2). A digital IF-to-BB² converter 14 in baseband processor 13 converts the digital IF signal 19 into a digital baseband signal 10. A matched filter 15 in the baseband processor 13 filters the digital baseband signal 10 to produce a digital baseband signal 18. Thereafter, the digital baseband signal

² Abbreviation for baseband.

- 18 is sent to a digital communication processing portion of the baseband processor 13 (Specification 3).
2. Appellants' disclosed RF receiver includes a mixer 33 that receives an analog RF signal, and produces analog IF signal 37 that inputs analog IF-to-digital BB converter 34 (Figure 3; Specification 6). As seen in Figure 3, the mixer 33 and the analog IF-to-digital BB converter 34 are included in RF receiver 31. The digital baseband signal 38 from the converter 34 is sent to the digital communications processing portion of the baseband processor 32. Figure 4 illustrates the details of the analog IF-to-digital BB converter 34 (Specification 6). In Figure 4, the analog IF from the mixer 33 (Figure 3) inputs the A/D converter 42 which in turn produces digital IF signal 49 (Specification 6). The digital IF is in turn converted to a digital baseband signal 40 by digital IF-to-BB converter 44 (Specification 6). The output from the matched filter 45 is a digital baseband signal 38 (Specification 6 and 7).
 3. Appellants acknowledge (Br. 6) that "Troster et al. disclose at Figure 6 (page 475) a circuit that is equivalent to baseband processor 13 of Figure 1 of Appellants' admitted prior art."
 4. According to the Examiner (Ans. 6), "Patel discloses a method and receiver for processing a desired signal wherein the desired signal is sampled, processed by a matched filter and then quantized (Abstract, lines 6-9, Column 2, lines 63-65 & Column 3, lines 39-41, 59-67 & Fig. 4-5)."
 5. "Fukuda discloses a parallel-to-serial converter for converting data in a parallel format (I & Q) into a serial format after demodulation of the

received signal so as to recover the transmitted data in the desired (serial) format (Fig. 2, element 210 & Column 3, lines 29-42 & Column 4, lines 20-35)” (Ans. 7).

PRINCIPLES OF LAW

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR International v. Teleflex*, 127 S. Ct. 1727, 1739 (2007).

It is an obvious expedient to the skilled artisan to integrate into a single unit individual devices that were known in the art to be separate but operating together. *In re Larson*, 340 F.2d 965, 968 (CCPA 1965).

ANALYSIS

In a comparison of Appellants’ admitted prior art (i.e., Figure 1) with the disclosed invention (i.e., Figure 4), we find that the separate RF receiver 11 and baseband processor 13 in Figure 1 are merely repackaged together in the single unit 34 in Figure 4 (Findings of Facts 1 and 2). Whether operating separately, as in Appellants’ admitted prior art Figure 1, or in a unitary package, as in Figure 4, the two communication receivers yield the same predictable results. Accordingly, claims 1 to 5, 7, 9, and 12 to 18 are manifestly obvious over the Appellants’ admitted prior art in Figures 1 and 2 and the accompanying disclosure in the Specification. As indicated *supra*, the teachings of Troster are merely cumulative to teachings already present in the Appellants’ admitted prior art (Finding of Fact 3).

In the absence of patentability arguments, claim 6 is obvious over the Appellants’ admitted prior art considered together with the teachings of Patel, and claims 8, 10, 11, and 19 are obvious over the Appellants’ admitted prior art and the teachings of Fukuda.

CONCLUSION OF LAW

The Examiner has established the obviousness of claims 1 to 19.

ORDER

The obviousness rejections of claims 1 to 19 are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED

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